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We Provide Solutions to Better the World through Innovation

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Elizabeth Scheehle, Branch Chief, Oil and Gas and GHG Mitigation Branch
California Air Resources Board
1001 "I" St., Sacramento, CA, 95814

Via Electronic Submittal:
[https://www.arb.ca.gov/lispub/comm/bcsubform.php?
listname=oilandgas2016&comm_period=1](https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=oilandgas2016&comm_period=1)

Ref.: CARB Oil & Gas Methane Rulemaking - Available Technologies for Monitoring Methane Fugitive Emissions

Dear Elizabeth,

Since we last had contact for my testimony at the CARB hearing in Sacramento on July 2016 very exciting new technologies for products and services became commercially available in the US at a very affordable price points !

Safety Scan as a solution provider for the industry is proud to announce that we became authorized reseller and authorized field service provider for such new technologies that the industry already is showing clear signs that they will adopt:



United Electric Vanguard Wireless HART Methane Leak Detector for 24x7 fugitive Emissions monitoring. UE is an American company with almost 100 years based in Boston, MA. Vanguard is a 100% made in the USA

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More details ?

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Each Vanguard detector has a *WirelessHART* transceiver, an antenna, a display, a long life power module, a gas sensor, and a signal processor for the gas sensor. Vanguard uses a sensor architecture trademarked “Flexsense”, which allows the sensor to identify its target gas and range to a Vanguard transmitter upon connection. It is currently available with either a Methane NDIR sensor or an electrochemical and H₂S sensor. Current ranges are 0-100% LEL of methane and 0-100 ppm of H₂S. It is the methane sensing capability that is deployed for detection of greenhouse gases.

Industry challenge addressed



Reducing methane is a challenge for the oil & gas industry, as is compliance with emerging regulation. The U.S. Environmental Protection agency has estimated that the U.S. petroleum and natural gas industry contribute 24.1 percent of the methane into the atmosphere. They also designate methane as a significantly more powerful greenhouse gas as carbon dioxide – 25 more potent per molecule

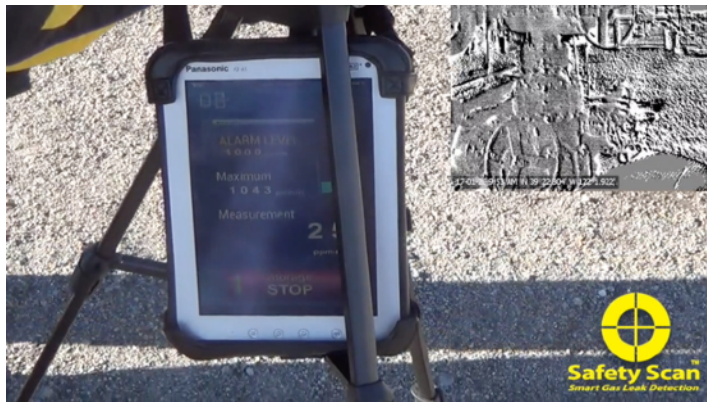
over a 100-year period and 84-87 times more potent over a 20-year period.

Other governmental bodies are following suit. **The State of California**, for example, has enacted legislation (SB1383) requiring business to take measures to help reduce methane emissions by 40 percent the year 2020

Increased monitoring can help meet such challenges, but can be expensive. The cost of adding just one new gas measurement point, including obtaining ‘hot’ work permits, running conduits for wires, burying them, and so on, can be in the neighbourhood of \$10,000 for land-based systems and as much as five times that for offshore applications. **Wireless technology can reduce the cost of adding a monitoring point by up to 90 percent.**

Benefits

The Vanguard monitor then reduces greenhouse gas emissions by removing cost barriers to increasing the density of monitoring devices. This helps reduce greenhouse gases, first by



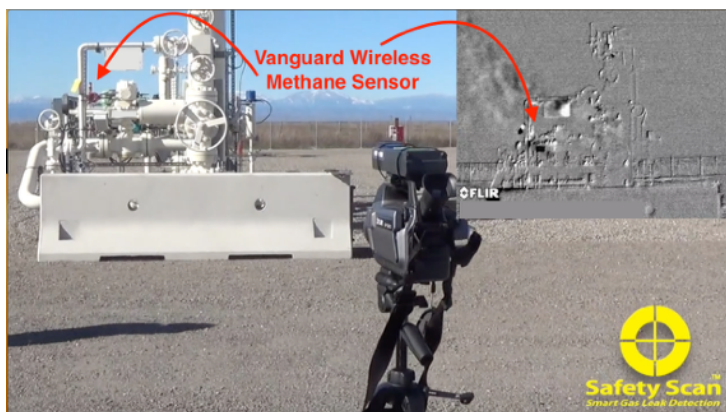
enabling identification of leaks across a much broader area than would be possible with wired devices, and secondly, by monitoring when and whether the leaks have been corrected. This contributes to a cleaner, safer environment for everyone, while at the same time avoiding fines and penalties that might arise from non-compliance.

The Vanguard provides producers with a maintenance benefit as well. By aiding early identification of assets that may be malfunctioning, it helps correct minor equipment performance issues before they become costly or may require total replacement and its unrivalled five-year battery life keeps additional maintenance costs to a minimum.

Best practices enabled

Mitigation of methane as a greenhouse gas is relatively recent. **California's** many legislations and regulations, that were enacted recently. Best practices for automating monitoring are only now forming. United Electric Controls has been conducting tests that will eventually inform best practices. Using Optical Gas Imaging cameras and LASER Quantification instrumentation provided by **Safety Scan**, we monitor the diffusion of trace amounts of methane from a simulated leak, factor in wind and other environmental conditions, and project the number of sensors that might be required to provide best coverage for an area.

Contribution to reduction of greenhouse gases



Wireless gas monitoring can contribute to the reduction of greenhouse gases on many fronts. The EPA has identified hundreds of thousands of potential leakage sites in the U.S. alone. These include 365,000 oil wellheads, 100,000 oil storage facilities, 555,000 natural gas wellheads, 400,000 miles of natural gas gathering pipelines, and 300,00 miles of natural gas pipelines. Most of these locations are aging,

increasing the risk of leakage.

Detecting and monitor leaks on so many facilities would not be economically feasible with wired stations. Affordable, easy to use wireless technology could, however, have a significant impact.

Safety Scan USA & United Electric Controls are already conducting a monitoring study in a Gas Storage Facility in California



Wellhead Methane Monitoring Case Study:

Purpose of Study:

Evaluate the Vanguard self-powered *Wireless* HART Methane Gas detection system for wellhead monitoring. The goal is to look at low level “fugitive emissions” and determine best practices for deployment to provide reliable detection. Part I of this study started

this year and it will continue with ongoing monitoring, the Vanguard Units are on Beta Test and being monitored continually. The Vanguard is moving from the beta phase and go into full sales phase in March of 2017

Want to read the details of this Part 1 ?

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Conclusion

Continuous Monitoring for fixed sources such as Wellheads, crude storage tanks, Compressor stations, regulator stations etc. is preferable to intermittent Monitoring using hand operated technologies (sniffer, hand held Open path radar), as a small leak can develop into a large leak in a short period of time. Handheld leak detection is costly due to high labor costs and is not timely unless deployed on a continuous basis. Traditional NDIR point detection is effective but costly due to high installation costs associated with wired (signal and power)

The best solution is self-powered wireless communicating gas detectors using a robust, open source, self-organizing wireless mesh network such as *WirelessHART*.



The Flir GF 320: Optical Gas Imaging Camera, although is not being pushed by this rulemaking I strongly believe this solution is more cost effective than method 21 due to the speed that we can perform leak inspections in a ratio about 20 to 1 compared to the sniffer and its related cost is way below this ratio. Plus consider the quality of the deliverable that will produce an infrared video image of the gas leaks (or the lack)

with embedded GPS and time and date stamp encrypted into the files to produce due diligence proof of the inspections. This solution replaces paper records according to the new US EPA NSPS Quad-O



Another alternative to mobile methane leak inspections is a pocket size device called: Laser Mini by Pergam Technical Services, a company with a US office in Seattle, WA headquartered in Zurich Switzerland

The Laser Methane mini (SA3C32A) Intrinsically Safe and Laser Methane mini-G (SA3C50A) are laser-type detectors, capable of safely and quickly detecting gas leaks from a distance. The Laser Methane mini-G guarantees best visibility through green laser and

capable to communicate with mobile devices! By linking to an Android device, you can view your recordings as a graph, the measurement history and measured locations on a map. The laser allows inspections in bright outdoor environments to a distance up to 100 ft. And the technology even allow for measurements works through glass and it is very easy to use



Safety Scan used a combination of these 2 technologies to perform its pre assessment engineering services to make sure the Vanguard sensors were installed and positioned correctly on the study referred above on a natural gas underground storage facilities in northern **California**, that it is in progress now

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I want to add the inspections for natural gas leaks on the streets of the many California communities, this is a very effective technology that can be mounted on vehicles. Since this solution has options for bumper mounted devices and a roof based equipment that can be used to inspect any natural gas leak source that is close to where people live. The inspection team just have to drive by and point its laser beam using a joystick type remote control

inside the vehicle that together with a computer onboard to record everything with GPS information to produce a very detailed report of the findings. Or just driving by the bumper sensor will detect methane leaks coming from underneath the road that it is driving over

This solution is called SELMA and it is provided by Pergam Technical Services based in Seattle and headquartered in Switzerland. It is important to note that this can be provided as a full solution including hardware, installation and training or as a service only to make it very affordable to natural gas utilities companies. It is important to note that the full solution is less than a third of the price of a solution that is being tested in the California market since last year



SELMA – the abbreviation for **Street Evaluating Laser Methane Assessment** – is one of the most advanced diagnostic tools for the detection of methane emissions from leaks or other sources. It detects and documents methane gas in the driving path of the vehicle.



Two independent laser systems monitor the driveway (SELMA MPB – bumper laser) and the sidewalk (SELMA Roof). SELMA MPB and SELMA Roof can operate simultaneously as well as separately. SELMA's main application is leak

detection on natural gas transmission and distributions pipelines, inspections of natural gas storage tanks, compressor stations and other potential sources of methane emissions to the atmosphere.

More details ?

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Thank you for seriously considering the latest available and affordable technologies in the United States to keep our communities safe, to maintain and monitor the quality of our environment and at the same time maintaining a vibrant industry moving forward creating safe jobs and progress in California.

Sincerely,

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